OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **FROST POND** the program coordinators recommend the following actions. *We would like to encourage the association to conduct more sampling events in the future. With a limited amount of data it is difficult to determine water quality trends. Since weather patterns and activity in the watershed can change throughout the summer it is a good idea to sample the lake several times over the course of the season.*

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show a *stable* in-lake chlorophyll-a trend, and concentrations remain well below the average New Hampshire values. Monitoring more than once per summer will help to accurately track the chlorophyll-a trend of the pond. While algae are present in all lakes, an excess amount of any type is not welcomed. Concentrations can increase when there are external and internal sources of phosphorus, which is the nutrient algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The bottom graph shows a *stable* trend in lake transparency. While the transparency was below the state mean, the Secchi disk was again visible on the bottom of the pond. Continued monitoring throughout the season helps us to determine a trend in transparency for the pond. The 2000 sampling season was considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show a *variable* trend for epilimnetic phosphorus levels. The phosphorus concentration was higher than last year's most likely due to the increase in rain we experienced this season. Rain can cause excess nutrients to be washed into the lake from the surrounding watershed. The phosphorus concentration in Frost Pond was above the state median this year. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- If this year's sampling events were hindered by lack of time, please remember the Franklin Pierce College Water Quality Lab is open at the college in Rindge. This lab was established to reduce the driving time for the VLAP monitors in the southwestern region of the state. This lab will ensure the quality of the analyses, since the time spent driving to the lab is much less than the drive to Concord. We encourage the lake association to utilize this lab next summer for all sampling events (except for our annual visit, of course!). To find out more about the lab, or to pick up bottles and equipment, call Michele Hood, the lab manager, at (603) 899-4384.

- Conductivity in the pond was lower than last year's result (Table 6). The levels of conductivity in Frost Pond have remained very low since VLAP monitoring began in 1996. This is a positive sign for the health of the pond.

- Dissolved oxygen was high throughout the Frost Pond water column (Table 9). Shallow ponds tend to continuously mix, due to wind and wave action. Oxygen from the air is able to enter the surface waters of the pond and get mixed down to the bottom waters.

NOTES

- Monitor's Note (6/7/00): Log Landing is site "L" with previous high phosphorus.

USEFUL RESOURCES

Weed Watchers: An Association to Halt the Spread of Exotic Aquatic Plants, WD-BB-4, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Aquatic Plants and Their Role in Lake Ecology, WD-BB-44, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Road Salt and Water Quality, WD-WSQB-7, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

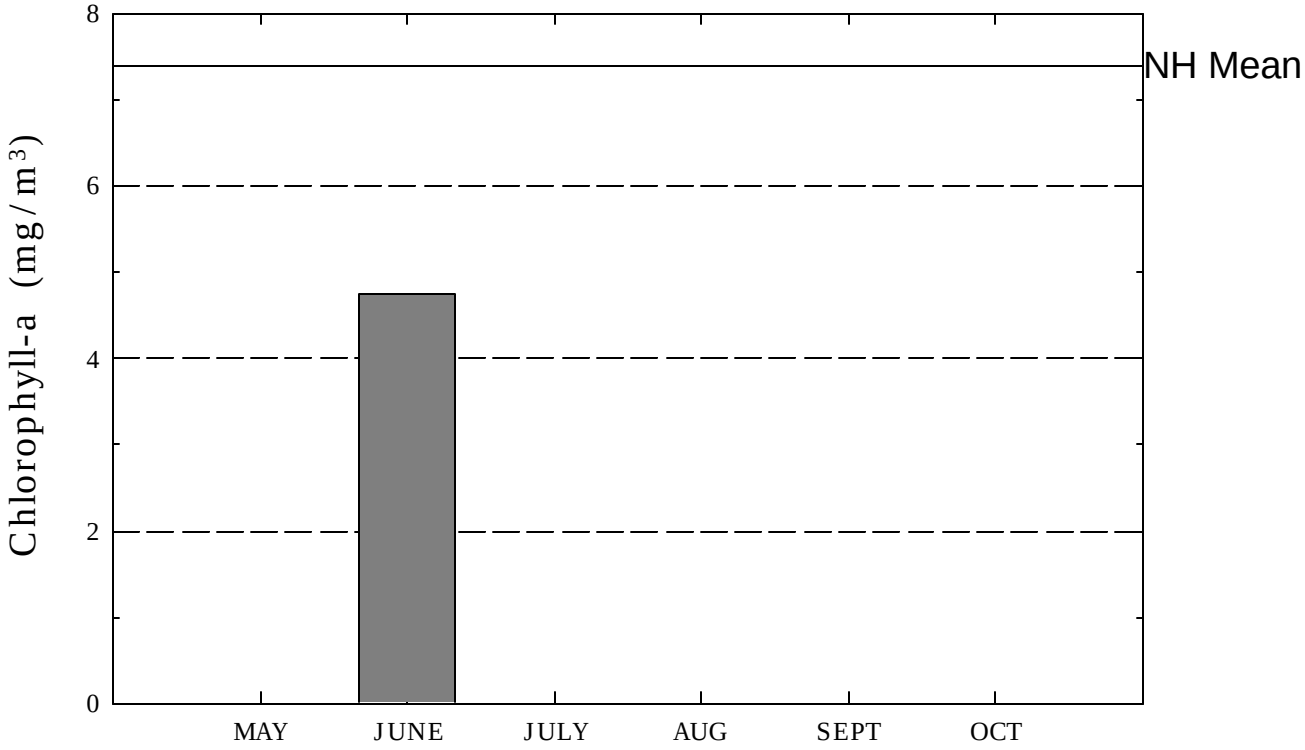
Riparian Buffers. Connecticut River Joint Commissions fact sheet. (603) 826-4800.

Effects of Phosphorus on New Hampshire's Lakes, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

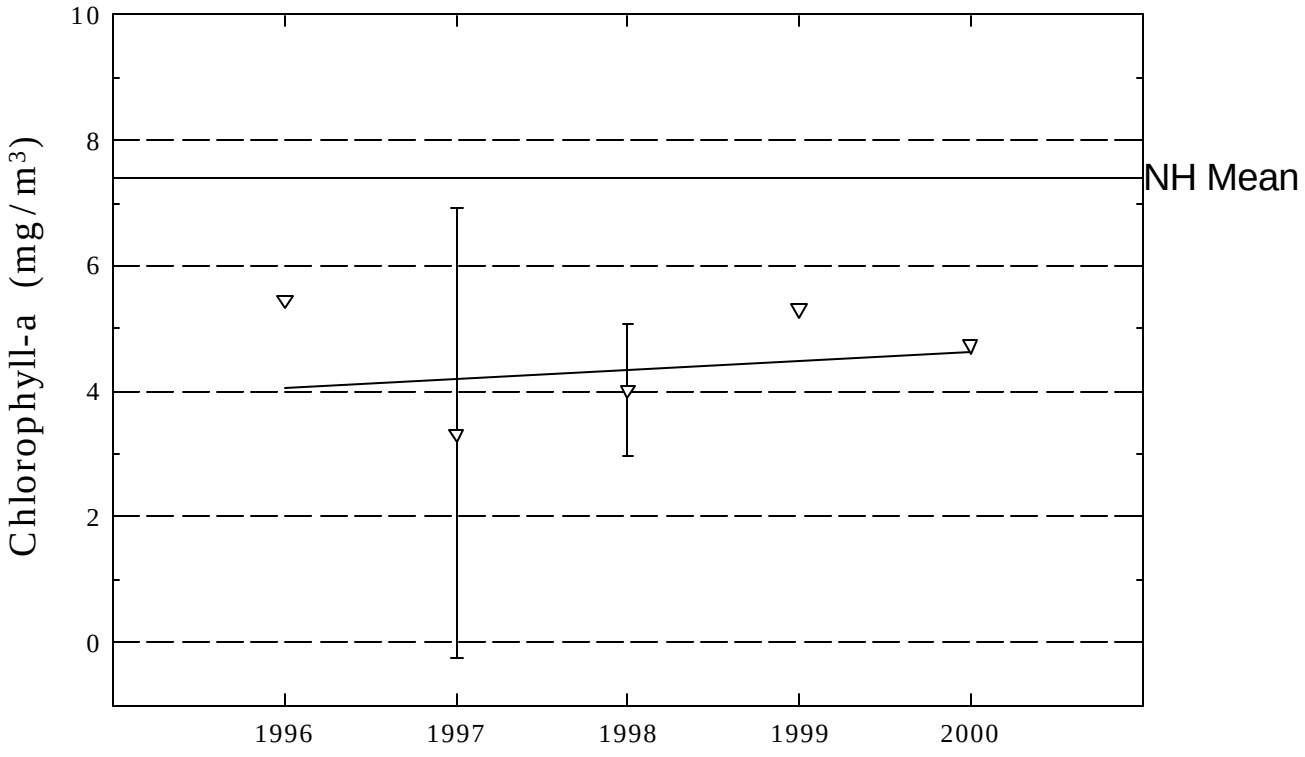
Answers to Common Lake Questions, NHDES-WSPCD-92-12, NHDES Booklet, (603) 271-3503.

Frost Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



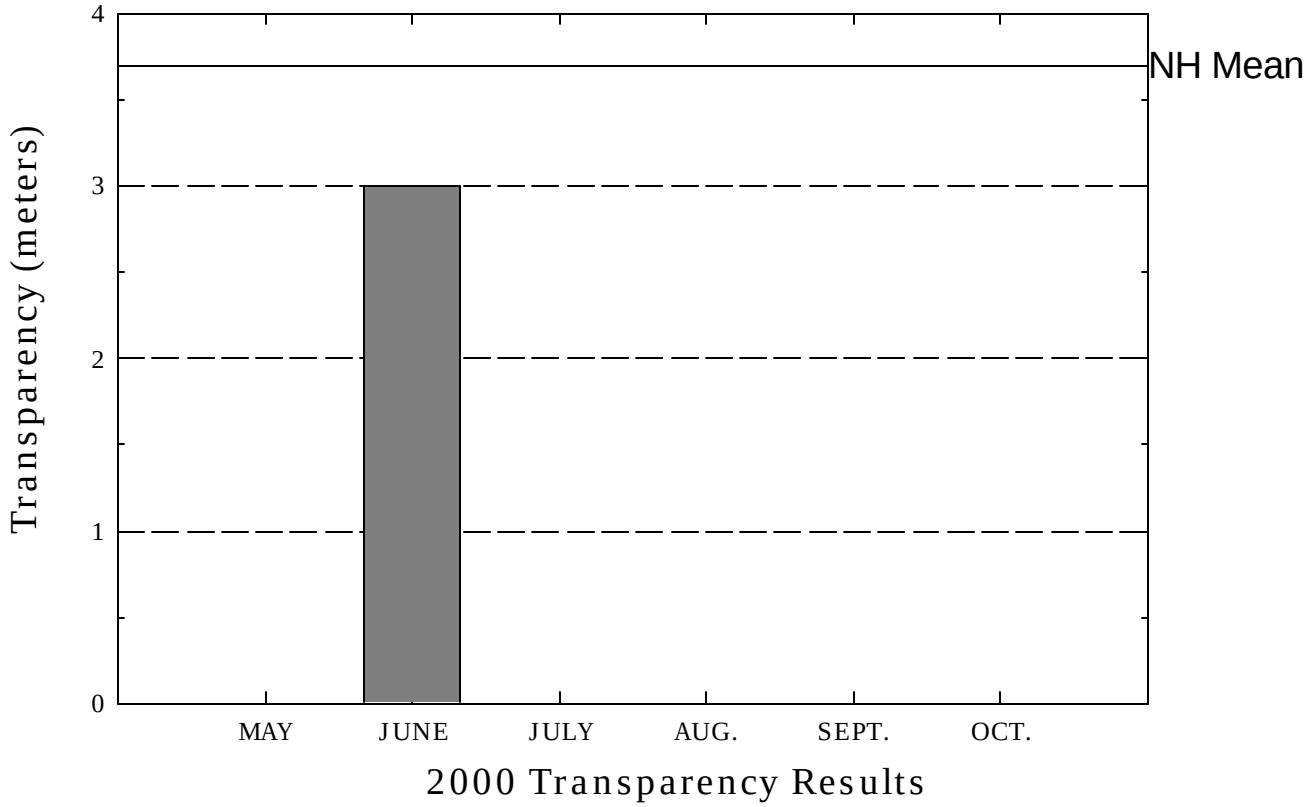
2000 Chlorophyll-a Results

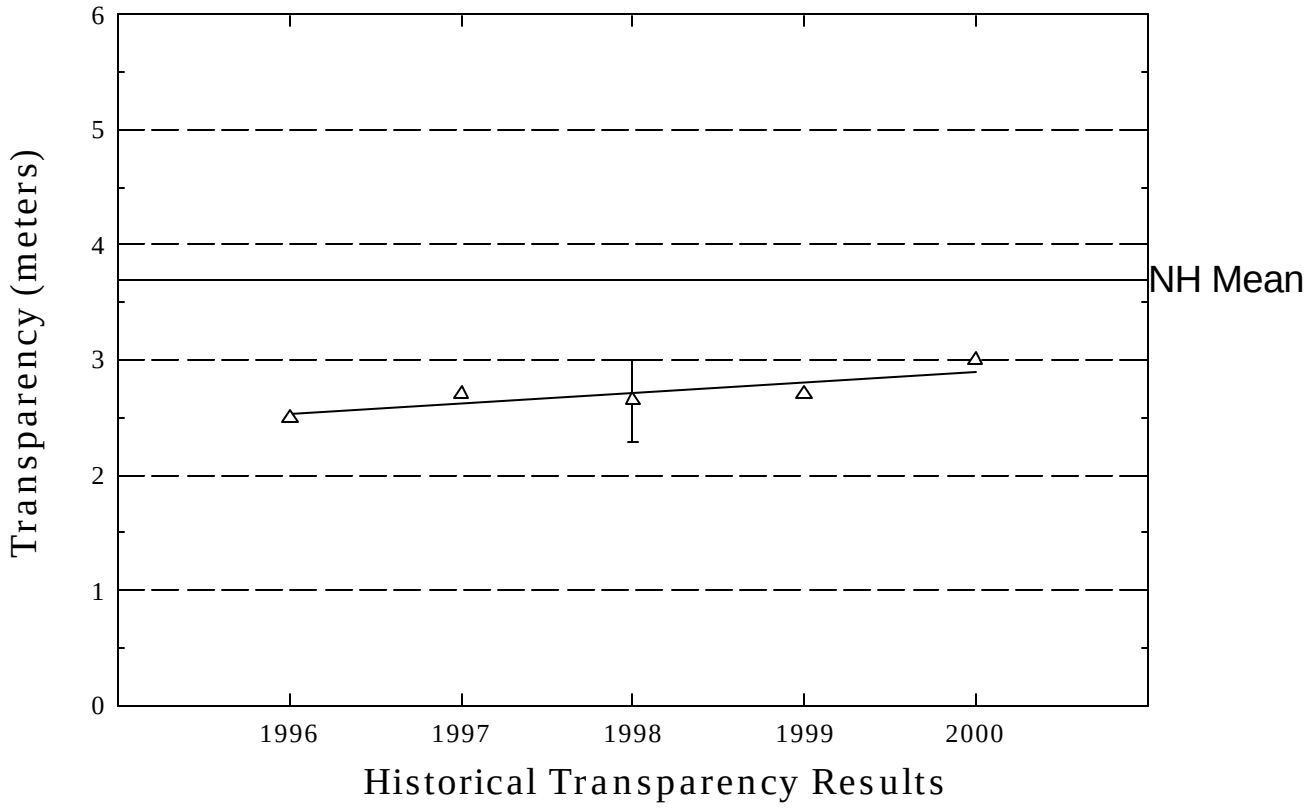


Historical Chlorophyll-a Results

Frost Pond

Figure 2. Monthly and Historical Transparency Results





Frost Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

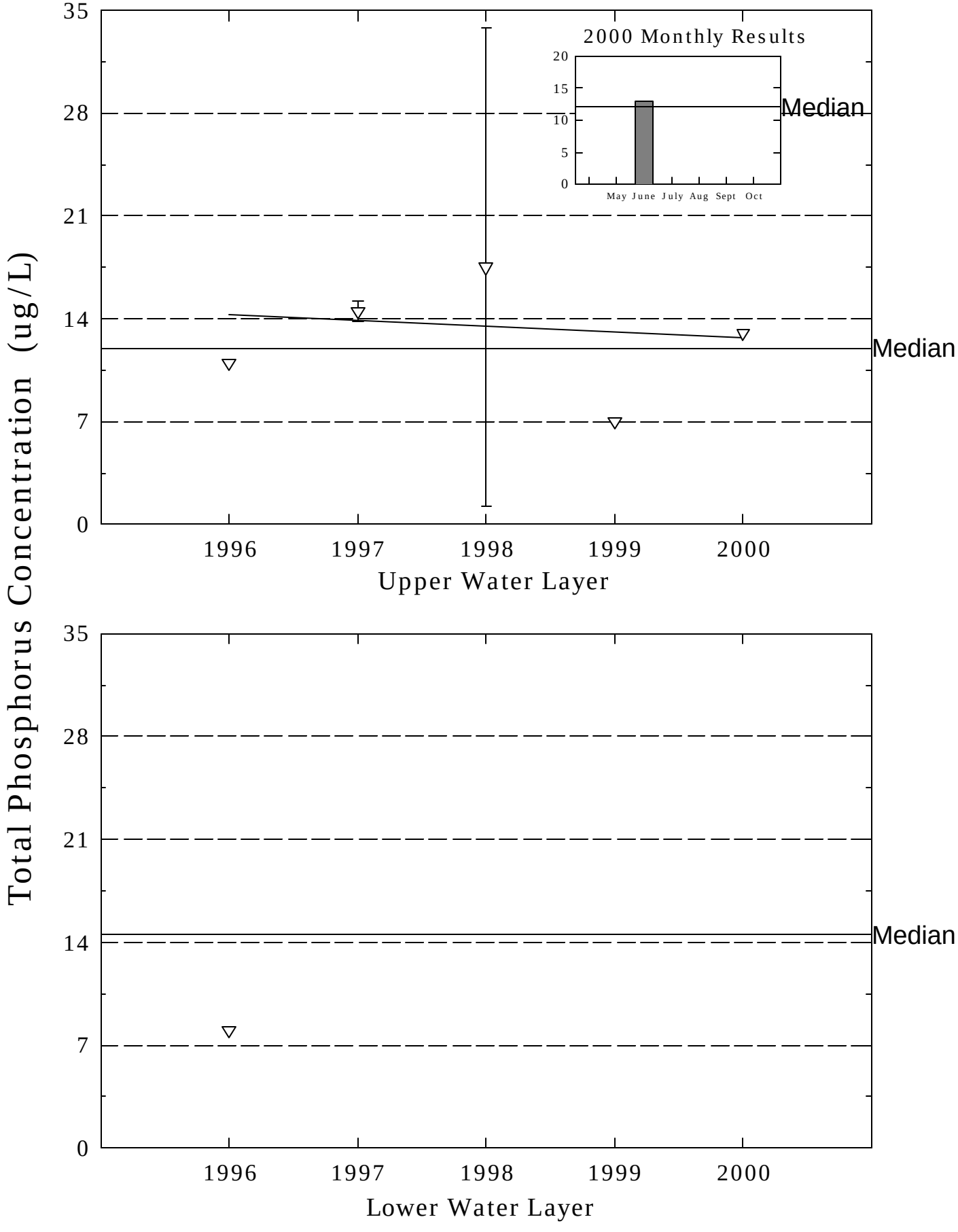


Table 1.

FROST POND

JAFFREY

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	Minimum	Maximum	Mean
1996	5.45	5.45	5.45
1997	0.80	5.86	3.33
1998	3.27	4.76	4.01
1999	5.31	5.31	5.31
2000	4.74	4.74	4.74

Table 2.

FROST POND

JAFFREY

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
08/26/1996	PERIDINIUM	58
	CHRYSOSPHAERELLA	18
06/05/1997	SYNURA	28
	TABELLARIA	24
	DINOBRYON	14
06/18/1998	ANABAENA	50
	CHRYSOSPHAERELLA	24
	UROGLENOPSIS	7
06/17/1999	DINOBRYON	52
	RHIZOSOLENIA	28
	CHRYSOSPHAERELLA	9
06/07/2000	ASTERIONELLA	48
	DINOBRYON	32
	SYNURA	12

Table 3.

FROST POND

JAFFREY

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
1996	2.5	2.5	2.5
1997	2.7	2.7	2.7
1998	2.4	2.9	2.6
1999	2.7	2.7	2.7
2000	3.0	3.0	3.0

Table 4.

FROST POND

JAFFREY

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1996	6.57	6.57	6.57
	1997	6.39	6.41	6.40
	1998	6.31	6.69	6.46
	1999	6.40	6.40	6.40
	2000	6.42	6.42	6.42
HYPOLIMNION				
	1996	6.38	6.38	6.38

Table 5.

FROST POND

JAFFREY

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as $CaCO_3$.

Epilimnetic Values

Year	Minimum	Maximum	Mean
1996	3.40	3.40	3.40
1997	2.80	3.10	2.95
1998	2.90	3.30	3.10
1999	3.50	3.50	3.50
2000	2.90	2.90	2.90

Table 6.

FROST POND

JAFFREY

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1996	24.9	24.9	24.9
	1997	22.5	25.5	24.0
	1998	21.8	22.9	22.3
	1999	24.7	24.7	24.7
	2000	23.9	23.9	23.9
HYPOLIMNION				
	1996	25.1	25.1	25.1

Table 8.

FROST POND

JAFFREY

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
COVE				
	1998	11	11	11
DAM				
	1998	7	7	7
EPILIMNION				
	1996	11	11	11
	1997	14	15	14
	1998	6	29	17
	1999	7	7	7
	2000	13	13	13
HYPOLIMNION				
	1996	8	8	8
ISLAND				
	1998	35	35	35
L				
	1999	19	19	19
P				
	1999	8	8	8
PUBLIC				
	1998	10	10	10
T				
	1999	8	8	8

Table 9.

FROST POND

JAFFREY

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
	June 7, 2000		
0.1	16.4	8.2	83.9
1.0	16.2	8.1	82.4
2.0	16.2	8.2	83.8

Table 10.

FROST POND

JAFFREY

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
August 26, 1996	2.5	24.5	7.8	91.0
June 5, 1997	2.5	16.9	8.6	86.0
June 18, 1998	3.0	17.8	6.0	62.0
June 17, 1999	2.0	22.6	7.6	87.8
June 7, 2000	2.0	16.2	8.2	83.8

Table 11.

FROST POND

JAFFREY

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1997	0.9	1.0	0.9
	1998	0.9	1.0	1.0
	1999	0.6	0.6	0.6
	2000	0.5	0.5	0.5